

# Claims

- [c1] 1. A method for determining fringing capacitance on a passive device within an integrated circuit, said method comprising:
- dividing a fringing capacitance region on said passive device into a plurality of fringing electric field areas;
  - developing a set of physically-based fringing capacitance equations for said plurality of fringing electric field areas accordingly;
  - determining whether or not an accuracy of said set of physically-based fringing capacitance equations meets a predetermined threshold; and
  - in response to a determination that an accuracy of said set of physically-based fringing capacitance equations meets said predetermined threshold, utilizing said set of physically-based fringing capacitance equations in compact device models to determine fringing capacitance on said passive device.
- [c2] 2. The method of Claim 1, wherein said method further includes in response to a determination that an accuracy of said set of physically-based fringing capacitance equations does not meet said predetermined threshold,

fitting said set of physically-based fringing capacitance equations to a set of extracted data to generate a refined set of physically-based fringing capacitance equations; and  
utilizing said refined set of physically-based fringing capacitance equations in compact device models to determine fringing capacitance on said passive device.

- [c3] 3. The method of Claim 2, wherein said set of extracted data is produced by extracting a fringing capacitance from a plurality of test passive devices.
- [c4] 4. The method of Claim 3, wherein said determining further includes comparing results obtained from said set of physically-based fringing capacitance equations and said set of extracted data.
- [c5] 5. The method of Claim 1, wherein electric field is constant along each field line within said plurality of fringing electric field areas.
- [c6] 6. The method of Claim 1, wherein electric field within some of said plurality of fringing electric field areas is formed by quarter circular lines.
- [c7] 7. The method of Claim 1, wherein electric field within some of said plurality of fringing electric field areas is

formed by a quarter circular line in combination with a vertical straight line.

[c8] 8. The method of Claim 1, wherein effects from inter-layer vias are ignored from said set of physically-based fringing capacitance equations.

[c9] 9. A computer program product residing on a computer usable medium for determining fringing capacitance on a passive device within an integrated circuit, said computer program product comprising:

program code means for dividing a fringing capacitance region on said passive device into a plurality of fringing electric field areas;

program code means for developing a set of physically-based fringing capacitance equations for said plurality of fringing electric field areas accordingly;

program code means for determining whether or not an accuracy of said set of physically-based fringing capacitance equations meets a predetermined threshold; and

program code means for utilizing said set of physically-based fringing capacitance equations in compact device models to determine fringing capacitance on said passive device, in response to a determination that an accuracy of said set of physically-based fringing capacitance equations meets said predeter-

mined threshold.

- [c10] 10. The computer program product of Claim 9, wherein said computer program product further includes in response to a determination that an accuracy of said set of physically-based fringing capacitance equations does not meet said predetermined threshold,
- program code means for fitting said set of physically-based fringing capacitance equations to a set of extracted data to generate a refined set of physically-based fringing capacitance equations; and
- program code means for utilizing said refined set of physically-based fringing capacitance equations in compact device models to determine fringing capacitance on said passive device.
- [c11] 11. The computer program product of Claim 10, wherein said set of extracted data is produced by program code means for extracting a fringing capacitance from a plurality of test passive devices.
- [c12] 12. The computer program product of Claim 11, wherein said program code means for determining further includes program code means for comparing results obtained from said set of physically-based fringing capacitance equations and said set of extracted data.

- [c13] 13. The computer program product of Claim 9, wherein electric field is constant along each field line within said plurality of fringing electric field areas.
- [c14] 14. The computer program product of Claim 9, wherein electric field within some of said plurality of fringing electric field areas is formed by quarter circular lines.
- [c15] 15. The computer program product of Claim 9, wherein electric field within some of said plurality of fringing electric field areas is formed by a quarter circular line in combination with a vertical straight line.
- [c16] 16. The computer program product of Claim 9, wherein effects from interlayer vias are ignored from said set of physically-based fringing capacitance equations.
- [c17] 17. A computer system for determining fringing capacitance on a passive device within an integrated circuit, said computer system comprising:
- means for dividing a fringing capacitance region on said passive device into a plurality of fringing electric field areas;
  - means for developing a set of physically-based fringing capacitance equations for said plurality of fringing electric field areas accordingly;
  - means for determining whether or not an accuracy of

said set of physically-based fringing capacitance equations meets a predetermined threshold; and means for utilizing said set of physically-based fringing capacitance equations in compact device models to determine fringing capacitance on said passive device, in response to a determination that an accuracy of said set of physically-based fringing capacitance equations meets said predetermined threshold.

[c18] 18. The computer system of Claim 17, wherein said method further includes in response to a determination that an accuracy of said set of physically-based fringing capacitance equations does not meet said predetermined threshold, means for fitting said set of physically-based fringing capacitance equations to a set of extracted data to generate a refined set of physically-based fringing capacitance equations; and means for utilizing said refined set of physically-based fringing capacitance equations in compact device models to determine fringing capacitance on said passive device.

[c19] 19. The computer system of Claim 18, wherein said set of extracted data is produced by means for extracting a fringing capacitance from a plurality of test passive devices.

- [c20] 20. The computer system of Claim 19, wherein said means for determining further includes means for comparing results obtained from said set of physically-based fringing capacitance equations and said set of extracted data.
- [c21] 21. The computer system of Claim 17, wherein electric field is constant along each field line within said plurality of fringing electric field areas.
- [c22] 22. The computer system of Claim 17, wherein electric field within some of said plurality of fringing electric field areas is formed by quarter circular lines.
- [c23] 23. The computer system of Claim 17, wherein electric field within some of said plurality of fringing electric field areas is formed by a quarter circular line in combination with a vertical straight line.
- [c24] 24. The computer system of Claim 17, wherein effects from interlayer vias are ignored from said set of physically-based fringing capacitance equations.